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ABSTRACT

This report is an early release of a measurement instrument used in a longitudinal project Management Implications of Team Teaching (MITT), and is taken from a larger, technical Project MITT report, "Governance and Task Interdependence in Schools: First Report of a Longitudinal Study." The report describes the development of a 24-item questionnaire scale assessing the sense of work autonomy among classroom teachers. The conceptualization of the domain and the procedures used in scale development are described. Data regarding scale reliability and score distributions for a population of teachers as well as the results of factor analyses undertaken to examine the dimensionality of the scale are included. (Author/MLP)

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Sense of Teacher Work Autonomy: Measurement & Findings

W.W. Charters, Jr.

EA 011 351

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Preface

Most reports of research come at the conclusion of a study. However, in the case of a longitudinal project, such as this one, a number of important advances deserve independent and early release. Among them are novel and potentially useful measurement operations. In Project MITT, we have developed four unique measures of variables central to our study and prominent to many other theoretical and empirical efforts. Here we report on the measurement and analysis of *Sense of Teacher Work Autonomy*. The other members of this short series of reports are *Task Interdependence Among Teachers*, *Control Structure in Elementary Schools*, and *The Norm of Teacher Autonomy/Equality*.

This report on sense of teacher work autonomy was written by W. W. Charters, Jr. who also is responsible for the creative leaps that led to the development of the measure. He was assisted by John DeFlaminis, Ken Bierly, and Suzanne M. Gaughen in the preparation of the items. Pilot tests were conducted in nine elementary schools. We are appreciative of the cooperation of faculties of: Francis Willard Elementary, Eugene, Oregon; Centennial Elementary, Springfield, Oregon; Lafayette Elementary, Albany, Oregon; Martin Luther King Elementary, Portland, Oregon; Robert Frost Elementary, Silverton, Oregon; Ruskin Elementary, San Jose, California; Rucker Elementary, Gilroy, California; Hazelwood Elementary, Campbell, California; and C. B. Whaley Elementary, San Jose, California.

This paper has been taken from a larger, technical Project MITT report, *Governance and Task Interdependence in Schools: First Report of*

a Longitudinal Study. It is published separately for those who seek easy access to the measure and related developments. To keep costs to a minimum we have elected to retain the pagination scheme of the full report. Otherwise this segment stands alone.

John S. Packard

Sense of Teacher Work Autonomy: Measurement and Findings

Alienation from work and kindred concepts have been nexus of concern in social theory at least since the days of Kar Marx and the subject of empirical investigation for over two decades in industrial and occupational sociology. Blauner (1964), in particular, has probed the various modes of worker alienation in modern industrial settings, including significantly the worker's lack of control over the immediate work processes in which he or she is engaged.

As the organizational setting of teaching has come under closer scrutiny in recent years, the work autonomy, or freedom from external control, of the classroom teacher similarly has been taken as a problemmatic issue. Public-school teaching, unlike other lines of work, has been regarded by some analysts as providing a high degree of day-to-day autonomy to practitioners of the craft, of attracting to its ranks people who value freedom in their work, and of furnishing physical and social conditions that protect and reinforce such freedom. Other sociological observers of the educational scene see teachers as essentially powerless pawns who pursue their daily activities closely constrained by bureaucratic rules and guidelines in whose establishment they have no effective voice. The tension between the autonomy of classroom teachers and the organizational constraints within which they work has been explored in depth by Dan Lortie (1964, 1969, 1975) for over a decade.

Influenced by Lortie's writings, Meyer and Cohen (1971) included an index of teacher autonomy in their study of the open-space elementary school, apparently in the expectation that the

individual autonomy of classroom teachers would give way as groups of teacher--teaching teams--came to exercise control over the instructional process. [1] As reasonable as their expectations might seem, Meyer and Cohen found that teachers in the open-space, team-teaching schools reported substantially greater autonomy that those in the self-contained classroom schools they used for comparison. This was true despite the fact that the open-space teachers also reported greater influcence over their instructional practices from fellow teachers (individually or in groups). The paradoxical finding led the investigators to re-examine their concept of teacher autonomy and to probe further into their data, but the paradox was not fully resolved.

How can the autonomy of an individual *not* be reduced when matters of work over which he or she once had substantial discretion become objects of team decision? As we phrase this question, it becomes apparent that a conceptual-definitional issue is at stake. The answer depends on whether we take "autonomy" to refer to the *objective fact* of the teacher's power--as a synonym for discretion--or whether we use "autonomy" to reference a subjective, *phenomenological response* of the individual to the situation in which one finds him or herself.

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1. They asked teachers to report, on a five-point scale, the amount of influence "you have over your own (a) administration of school rules and regulations, (b) student grading practices, (c) curriculum planning, (d) teaching specific lessons or classes, and (e) student control and discipline practices." Autonomy scores were obtained by summing weighted responses over the five areas of instructional practice.

If the former, autonomy will be lost as discretion is lost by definition. On the other hand, if autonomy means a subjective feeling about the situation, it is possible (although not expected) that autonomy will increase when the group of which the individual is a part makes decisions that once were soley his or hers.

Much of the empirical literature on alienation, power and powerlessness, organizational control structure, and the like equivocates on this conceptual issue. Meyer and Cohen, too, were not entirely consistent as to whether they regarded their index of autonomy (and other "influence" measures they used) to refer to the objective facts of the teacher's work situation or whether they took the term in its phenomenological meaning--equivalent to perception of one's own influence. The questions they asked teachers were ambiguous on the point, and the investigators' language sometimes favored the former meaning and sometimes the latter.

One important feature of the MITT Project's longitudinal study of elementary schools has been to maintain a clear separation, conceptually and operationally, between the objective and subjective levels of the variables. Appendix B reports in detail the manner of assembling objective evidence regarding the locus of instructional decisions within the school's "control structure", the objective counterpart to sense of autonomy (and sense of collegial power). The present appendix describes the development of a 24-item questionnaire scale assessing the sense of work autonomy among classroom teachers. We report here our conceptualization of the

domain and the procedures used in scale development. Data regarding scale reliabliity and score distributions for a population of teachers are available for presentation, as well as the results of factor analyses undertaken to examine the dimensionality of the scale. We begin with a description of the final scale.

A. The Sense of Autonomy Scale

The 24 items of the final scale are shown in Table 1, along with the instructions for responding teachers. While developed specifically for grade-level teachers in elementary schools, item wording does not preclude its use with secondary teachers. The items do assume, however, the staff member teaches regular classes in the school, and, in that sense, the scale is not applicable to specialists with irregular teaching duties or none at all. For inclusion in a questionnaire, the items should be re-arranged from their order in Table 1 so that those with similar content do not appear together.

Teachers respond to each item according to a Likert format. The response alternative used in the MITT questionnaire are:

Strongly agree
Agree
Moderately agree
Moderately disagree
Disagree
Strongly disagree

Alternatives are weighted from 6 (for "strongly agree") to 1 (for "strongly disagree"), except for the 14 items, marked with an asterisk, whose wording is reversed in substantive meaning. For those 14 items, the weights run from 1 to 6. In scoring a teacher's questionnaire return, weights of the chosen alternatives are summed over the 24

Table 1
Items for the Sense of Autonomy Scale

FEELINGS TOWARD WORK

For the following items please indicate the extent to which each describes your feelings about your work in this school.

1. On the whole, my students and I can establish the rhythm of daily activities rather than have it determined for us by people or events outside the classroom.

2. Generally speaking, I believe I can pretty well decide my own pace of work as a teacher.

*3. Much of the time I feel pressed by the daily schedule.

4. In my present job I feel relatively free to decide how fast to cover instructional material with my students.

*5. Curriculum guides exert an uncomfortable influence on what I teach.

*6. I sense pressure from the administration concerning how I spend my time during the day.

*7. In this school a teacher has to look busy when he is on duty, even when there is nothing urgent to do.

*8. I am so tied down to the classroom that I would find it hard to take a short break from the kids, even if I really needed to.

9. Aside from things which lie in myself, there is little that holds me back from doing a good job of teaching.

*10. I simply cannot find the time I need in this school to do the kind of teaching I know I am able to do.

11. I feel as though I can pretty well decide what youngsters I will work with in my classroom.

*12. I rarely have a chance to use the teaching methods I think work best for me.

13. I feel free to try out new teaching ideas with my classes.

*14. Generally speaking, I feel as though the teaching techniques I can use are closely controlled in this school.

Table 1 Continued

15. School funds permitting, I believe I am perfectly free to use whatever instructional materials I think will work with my classes.

*16. This school exerts an excessive influence on the discipline measures I can use in the classroom.

*17. I would have uneasy feelings if I gave unusually high (or low) grades to my classes, even though I had sound reasons of my own for doing so.

*18. I feel I have little say over how the progress of my students is to be judged.

19. I am confident that the principal trusts my judgment when it comes to evaluating class performance of students.

*20. I feel that in this school I must abide by someone else's ideas on how I should grade my own students.

21. This is one school, at least, in which I do not feel as though someone were peering over my shoulder at the way I teach.

22. I feel free to say whatever I wish to my pupils in the classroom.

*23. I must constantly be on guard around here against doing or saying the wrong things in my teaching.

*24. A lot of the time I have the idea that other teachers want to find out what I am doing in my classroom teaching just so they can judge me.

items, then divided by 24. In principle, scale scores can range from 1.00 to 6.00, where a low value indicates low feeling of autonomy in work and a high score represents a strong sense of autonomy. Where one or two, but not more than two, items are skipped by a teacher, our practice has been to compute the respondent's scale score after dividing by the number of completed items--which, in effect, is to assign the skipped items the mean value of the completed items. No score is computed if more than two items have missing values.

B. Conceptualization

Sense of autonomy is a psychological construct representing a teacher's beliefs about his or her freedom from external interference, pressure, or control in performing the work of classroom instruction. A strong, or high, sense of autonomy means that the teacher feels generally free to guide his instructional work with students in terms of his or her own personal judgment; he or she may solicit ideas and advice from others, but he or she feels no obligation to accept suggestions without weighing their merits. A low sense of autonomy implies that the teacher feels generally constrained in his or her work activities by persons, rules and regulations, or other conditions and forces lying outside the immediate instructional setting and outside of him or herself; he or she believes there is little latitude for bringing personal judgment to bear in the performance of his or her work.

Low sense of autonomy is conceptually similar to the dimension of alienation that Seeman (1959) termed *powerlessness* ("the expectancy held by the individual that his own behavior cannot

determine the occurence of the outcomes, or reinforcements, he seeks"), except that sense of autonomy in our usage focuses specifically on the work situation rather than globally on the individual's relation to the society and world at large. In our case, the outcomes to be sought are those of "doing a good job of teaching", however the teacher may define it.

An *external* constraint on task performance is one which emanates from beyond the immediate instructional setting. Shortly, we will indicate the general character of such constraints, but here we need to point out two types of limitation on "doing a good job of teaching" that are *not* implicated in our conception of sense of autonomy. First, difficulties the teacher experiences in working with pupils is not an external constraint; it is part of the challenge of the teaching job itself and does not concern autonomy as we mean it, unless, of course, the teacher believes he or she is restricted in coping with the difficulties by forces outside the classroom walls.

Second, we exclude from our meaning of sense of autonomy the teacher's beliefs regarding his or her own competence or ability to perform the tasks at hand. Teachers vary markedly in the extent to which they have confidence in their capacities to do a "good job of teaching" independently of constraining forces from the outside, and we wish not to confound variations in feelings to personal efficacy, self-confidence, competence, and the like with the concept of autonomy.

The import of these exclusions is that a high sense of

autonomy is a necessary but not sufficient condition for a teacher to believe his or her own actions can determine the outcomes he or she seeks. The absence of outside interference, regulation, or pressure does not certify *ipso facto* that he or she will feel in full command of the instructional task. Discussions in the literature on power and powerlessness, internal and external locus of control, and similar polarities are not always clear on the asymetrical nature of the terms.

We regard sense of autonomy as a kind of attitude, emphasizing the affective component. Like any attitude, it is assumed to mediate, along with other dispositional properties of the individual, between objective conditions of the workplace and manifest behavior. It is not expected to stand in a one-to-one relationship either with objective conditions nor with behavioral variables. Thus, alterations in the school's control structure, objectively defined, have differential implications for feelings of autonomy, depending upon other social circumstances or psychological dispositions of the individuals affected. We anticipate, for example, that a basic personality attribute, the individual's need for autonomy, is a contingent dispositional factor, and that the presence or absence of a norm of autonomy in the workgroup of which the teacher is a member is a contingent factor of a social variety. Similarly, the linkage between sense of autonomy and behavioral consequences is contingent on other dispositions and conditions. Specifically, we postulate that sense of autonomy is one contributor to teacher job

satisfaction, depending, however, on the importance he or she attaches to autonomy in his or her range of occupational values.

In his study of alienation among manual laborers and craftsmen, Blauner (1964) offered a useful analysis of the component of the immediate work setting significant to the worker's feelings of freedom or control. He discussed such things as "freedom of movement, freedom to make choices, freedom from oppressive constraints." The constraints in which Blauner was interested were not just those posed by other people, like supervisors, but constraints arising from the nature of the work itself, including workflow conditions and the intrusion of machines. "Freedom", as Blauner saw it, "is the state which allows a person to remove himself from these dominating situations that make him simply a reacting object." Lortie's (1969,1973) various analyses of teachers and teaching added particulars to the same line of thought and pointed up components of work especially significant in the classroom setting.

We drew on these two sources for ideas concerning specific domains of teacher sense of autonomy. The first five components in the following list are Blauner's, with questions translating the components to apply to the context of teaching, while the last two were suggested by Lortie's writings.

a. Control over the *pace of work*. (Blauner regarded this as the most important component among manual workers by virtue of its effect on the level of the worker's freedom in other components.) Does the teacher feel he or she can set the pace in his or her teaching, or

does he or she feel the pace is established for him or her by the daily schedule or other conditions?

b. Freedom from the *pressure* of work. Does the teacher feel under pressure to cover material or to keep ahead of the class, or does he or she feel he or she can carry out his or her teaching duties in a relaxed manner?

c. Freedom of *physical movement*. Does the teacher feel inexorably tied down to his or her location of work, the classroom, or does he or she feel he or she can take time away from his or her teaching during the day?

d. Freedom to control the *quality* of one's work. Does the teacher feel he or she can take the time he or she needs to work with individual students; does he or she feel under constraint in preparing for his or her teaching?

e. Freedom to choose the *techniques* of work. Does the teacher feel free to try out his or her own ideas in the classroom, to choose the teaching methods he or she will use, and to use instructional materials of his or her own choice?

f. Freedom to determine the *criteria* and techniques for assessing student performance. Does the teacher feel he or she can decide how he or she will grade pupils, or does he or she feel he or she must use the results of standardized tests, grade on "the curve", or use someone else's criteria of judgment?

g. Freedom from *surveillance* by parents, supervisors, or other teachers. Does the teacher feel that other people are keeping

a close watch over the way he or she teaches, that he or she must constantly be on guard in what he or she says or does in the classroom, or that he or she is being supervised too closely by the principal or others?

These components represent an extensional definition of the sense of autonomy construct used in the study.

C. Scale Development

Using our conceptualization as a guide, MITT staff members wrote a large number of questionnaire items intended to tap sense of autonomy; after compiling, discussing, and editing, the number reduced to twenty-six.[2] Since we planned to develop a summative scale, items were written to sample the components listed above. We did not attempt to sample any given component heavily enough to allow us to measure it as a separate dimension; in any event, we were not certain, at the item-writing stage, that the components were entirely applicable to the work of teaching. The items listed in Table 1, incidentally, are arranged in order of the components, *a* through *h*, of the preceding section. The two additional items subsequently dropped from the scale follow:

25. I doubt that I would have trouble getting a few days off from school once in a while to attend to personal business.

26. This is a community where a teacher must be especially careful not to discuss topics in his classes which are controversial. (Reversed scoring.)

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2. Two graduate research assistants were especially helpful in this phase of the work: John DeFlaminis and Suzanne Gaughen.

The item-writing sessions brought into focus several issues that subsequently sharpened our conceptualization of sense of autonomy. It may be useful to review them here.

a. We had to take care that the source of control over teaching activities reflected in the items lay outside the classroom and excluded the teacher's students. We assumed that teachers (or many of them) regard it as fitting and proper for their instructional plans to be constrained by student interests, capacities, or demands and that such feelings of constraint from within the classroom are not indicative of sense of autonomy as we defined it.

b. We sometimes found it hard to write items restricted to teaching activities rather than to more general aspects of the teacher's work in the school, like constraints on arrival and departure times or constraints on personal liberties away from school.

c. Similarly, we encountered some difficulty in writing items that did not simply mirror objective conditions of work--*i.e.*, items that merely asked teachers to report features of their work situation. If responses would automatically vary under different or changed conditions of the school, the item was rejected.

d. Special pains were required to avoid items that touched on teacher feelings of competence. We found that we could detect such items by asking ourselves whether increased experience in teaching would or would not, by itself,

lead to more positive responses.

In the end, 26 items deemed potential candidates for the sense of autonomy scale were prepared and placed in a questionnaire for field testing.

D. Item and Scale Performance

A field trial of the various scales intended for inclusion in the teacher questionnaire of the MITT study was conducted in the fall and winter of 1973-74. (Appendix D gives further details of the field test.) With regard to the sense of autonomy scale, the Project staff addressed three basic tasks: (1) the identification and deletion of defective items from the scale, (2) determination of the scale's reliability, and (3) certification that the sense of autonomy measure would be reasonably independent of the other phenomenological variables key to the MITT study.

The field test was carried out in nine public elementary schools of Oregon and California selected to reflect the range of characteristics of schools likely to be chosen for the main study. An effort was made, for example, to obtain several schools with open-space architecture and reputed to be team teaching, as well as schools of a more conventional mode. Questionnaires were administered by MITT staff members at the end of November 1973 in Oregon schools and in the middle of January in California yielding 170 useable responses. Teachers in two of the Oregon schools were readministered an identical form of the questionnaire in late April 1974--

nearly five months after the first administration. Although the number of teachers responding twice was small--24 for this scale--the retest provided grounds for estimating the stability of the measure.

1. Defective items. Two approaches were taken to identify items that were obviously defective or that did not contribute to the scale. First, the response distribution of each item over the six alternatives was inspected for instances in which little or no variation was displayed. Table 2 shows the distributions obtained in the first wave of data collection of the main study. (We show these rather than results of the field trial, since the two sets are closely parallel, and the former is the more relevant for subsequent analysis.)

Responses tended to fall on the "high" sense of autonomy side of the distribution for most of the items. That is, respondents tended to agree with the positively worded items and to disagree with the negative items, but in no instance did a large majority of responses congregate in one category. There were six items in which over one-half of the responding teachers chose a single alternative, but the number did not exceed 55 percent. Several items had rather high non-response rates, as indicated in the left column of the table. This is especially true for Item 11, which asks teachers whether or not they feel they can "decide what youngsters I will work with in my classroom." This item could be ambiguous for teachers in self-contained classrooms where there is no choice as to who is in the class but where the teacher can decide on how to distribute his time among those that are there. Despite the item's possible ambiguity, we were

TABLE 2: Percentage Distributions of Responses to Twenty-six Sense of Autonomy Items, MITT Teachers, Spring 1974. N = 619.

Item**	Alternative*** 6	5	4	3	2	1	Non-Responses (Number)
1	43	34	16	2	4	1	4
2	51	34	10	3	2	*	-
3 R	8	26	17	25	14	10	1
4	46	39	11	3	1	*	-
5 R	15	47	22	10	4	2	22
6 R	22	47	12	12	5	2	8
7 R	25	43	15	11	4	2	11
8 R	16	31	14	15	12	12	8
9	29	42	13	9	5	2	11
10 R	14	40	18	15	6	7	15
11	12	21	17	11	28	11	46
12 R	23	54	15	5	2	1	9
13	45	46	7	1	1	*	1
14 R	22	52	13	7	5	1	7
15	38	42	12	3	4	1	3
16 R	10	42	17	15	11	5	10
17 R	20	49	16	8	5	2	15
18 R	19	54	16	7	3	1	7
19	38	45	13	2	1	1	5
20 R	24	48	13	9	4	2	7
21	33	42	14	6	3	2	5
22	18	43	23	10	5	1	8
23 R	18	52	18	8	3	1	6
24 R	31	50	11	5	1	2	9
25	13	31	11	9	21	15	7
26 R	9	41	24	16	7	3	18

*Less than 1 percent.

**See Table 1 for wording of first 24 items and text of the appendix for Items 25 and 26.

***A column heading of 6 corresponds to the "Strongly Agree" alternative, except for items with reversed scoring, marked R by the item number, in which case 6 corresponds to the "Strongly Disagree" alternative.

reluctant to drop it from the scale at this point because it is especially pertinent to the changes in instructional organization anticipated in schools of the MITT study. With that exception, our inspection revealed no items that were clearly defective from the standpoint of their response distributions.

Our second approach to item deletion was to examine the matrix of item intercorrelations from the field trial data in an effort to detect those correlating poorly with others in the scale. While most of the items had uniformly positive and substantial correlations (taking account of reversed content), two in particular had essentially zero coefficients with the others in the matrix, sometimes falling on the negative side of zero. These were Items 25 and 26. The algebraic means of their coefficients were +.002 and +.085 respectively. These values can be compared with the means of the remaining 24 items in the scale of +.270.

Reconsideration of Item 25, asking teachers about the difficulty of "taking a few days off from school to attend to personal business", brought the realization that it was probably a faithful reflection of differences in an objective condition of the school, *viz.*, whether or not such leaves were covered by the teachers' employment contract or a school policy. Item 26, asking teachers about community concerns regarding the discussion of controversial topics in the classroom, was the sole item specifically focusing on constraints from the nonschool source. We recognized that responses to this item

would probably vary with the provincialism of the community in which a school happened to be located and would be relatively insensitive to the through-time changes within the school that the MITT study was intending to investigate. Both items, then, seemed to be potential candidates for deletion from the scale. Item 11, called to our attention by the large number of nonresponses, had somewhat higher correlations than Items 25 and 26, although lower than the rest. Its mean was +.161 (with Items 25 and 26 removed), compared with a mean of +.270 for the remaining 23 items.

Pursuant on the computation of the intercorrelation matrix, a factor analysis was performed and the first principal component of the unrotated factor matrix was inspected for unusually low loadings. Most items had loadings on the first component in excess of .35 (up to .75) but Items 25 and 26 had loadings closer to zero: .06 and .24, respectively. (Item 11 loaded slightly higher, .29.) This information plus the substantive considerations noted above confirmed our decision to drop Items 25 and 26 from the sense of autonomy scale. A subsequent rotation of the 26-item factor matrix further supported this decision: the items each loaded on a weak and uninterpretable factor in the rotated matrix. The same can be said for Item 11, but the pivotal nature of the item content led us to retain it for scoring purposes. A consideration to be brought up in Section F questions its retention.

Our discussion of the sense of autonomy measure from here on, and throughout the report, relates to the scale with Items 25 and 26 deleted.

2. Reliability estimates. An initial estimate of reliability of the sense of autonomy scale was obtained from responses to the instrument administered during the winter of 1973-74. With specialists and other nonclassroom teachers excluded. There were 126 teachers who gave responses to all 24 items. The reliability estimate was based on computations of the variance of total scale scores (not the mean scores) and the variance of scores for each item, and from these the ratio of universe score variance to expected observed-score variance--the reliability coefficient--was calculated (Stanley, 1971). This is essentially an estimate of internal consistency of the scale. In the present application its value was .901.

A more revealing approach to the evaluation of reliability, or "generalizability", was obtained from a readministration of the trial questionnaire nearly five months later in two of the field-test schools, following procedures developed by Cronbach, *et al.*, (1972), in which both item and occasion (test-retest) contributions to error variance are taken into account. The approach yields estimates of the separate variance components from analysis of variance computations, in our case a three-way analysis of variance of p x i x j, where *p* refers to person, *i* to items ($n_i = 24$) and *j* to occasions ($n_j = 2$). For this analysis, the number of classroom teachers in the subsample was $n_p = 24$.

Using the randomized model for estimation, the first column of numbers in Table 3 gives the estimate of each variant component--for person (teacher), item, occasion, their three interactions, and the residual. Variance components are divided by the numbers in the second column to obtain expected observed-score variances, the third column.

TABLE 3: Estimated Variance Components for Sub-Sample of Field-Trial Teachers and Estimated Reliability and Measurement Error Applicable to MITT Study Design.

Source of Variance	Estimate of Variance Component*	Sampling Frequency	Expected Variance	Error of Measurement
p (person)	.1899	1	.1899	
i (item)	.4372	24	.0182	
j (occasion)	0	1	0	
pi	.3924	24	.0163	.0163
pj	.0246	1	.0246	.0246
ij	.0157	24	.0007	
pij,e	.4609	24	.0192	.0192
				$\hat{\sigma}^2(\delta)$ = .0601

MITT Study Design: p x i x j, n_i = 24, n_j = 1.

$\sigma^2(u_p)$ (universe score variance) = .1899

$\hat{\sigma}^2(\delta)$ (error of measurement) = .0601

$E\sigma^2(X_{pI})$ (expected observed-score variance) = .2500

E_p^2 (reliability) = $\frac{\sigma^2(u_p)}{E\sigma^2(X_{pI})}$ = .76

*From crossed design, p x i x j; n_p = 24, n_i = 24, n_j = 2.

The latter values are relevant to the data-taking design of the MITT study proper, where we intend to estimate the teacher's universe score (relative to that of all teachers) from just one administration of the 24-item scale in each semi-annual wave of data collection. The reliability (generalizability) coefficient and estimates of error variance for the intended design are reported at the bottom of the table.

The reliability is shown as .76, lower of course than the .901 value for the total sample that reflects only the scale's internal consistency. Examination of the expected variance components shows, indeed, a large contribution to error of the person-by-occasion component, $\hat{\sigma}^2(pj) = .0246$. The other two contributors-- the person-by-item component and the residual--are small by comparison. (The square root of these values scales them to the actual score range, 1.00 to 6.00.) Apparently, responding teachers tended to shift their relative positions from one administration of the measure to the next, producing an element of through-time inconsistency. Our intended design samples this source of error only once in a given wave of data collection, providing no opportunity for bringing it under better control. In principle, we could do better to improve reliability by administering the scale twice to teachers than by doubling the number of items.

This line of thinking led us to consider the "enduringness" of the attribute we were seeking to measure, particularly in light of the time interval implicated in the two test administrations, late November to mid-April, and unknown conditions in the field-trial sites.

Conceivably, changes could have occurred in teacher "true scores" during the delay of nearly five months, and some of what we are calling error variance could rather be regarded as systematic, or "wanted", variance. Unfortunately, we know little about the two schools in the sub-sample, specifically whether or not events had occurred during the interval that might be expected to alter teacher sense of autonomy. Presumably this attribute is not immutable among teachers, for if we thought it were the hypotheses of the MITT study it would be nonsensical.

We are dealing, in Thorndike's (1951) terms, with a "temporary but general" attribute of teachers rather than a "lasting but general" attribute, but the difficult question is, how temporary is temporary? Is the "enduringness" of the sense of autonomy attribute in which the MITT study is interested a matter of only a day or a week (certainly not), a matter of a month or two or an academic semester (possibly), a year (perhaps), or several years (no)? If the universe of admissible occasions is a year, that is, if we are willing to accept a measure taken on any day of the school year as interchangeable with one taken on any other day in that time span, then the variance component we obtained for the test-retest interval is to be regarded as error variance, and we would, in fact, sample it twice in the MITT study. In that case, the reliability estimate of the combined measures would increase to .88. (Not only would the occasion component be sampled twice, but the residual component would be sampled twice as often also.)

However, certain hypotheses of the MITT study depend on our ability to identify changes in teacher sense of autonomy associated

with short-run alterations in particular aspects of school organization. For example, there would be evidentiary value in observing an increase in sense of autonomy immediately following the formal establishment of a unitized staff organization at the first of the school year but prior to the emergence of task interdependence among teachers later on in the year. The very purpose of the twice-yearly schedule of data-collection was to allow us to detect such short-run changes. This framework implies that we take "temporary" to mean an interval of about a school term and that the universe of admissible occasions would be any testing day between, say, October through November for the first term and between February through April in the second. Our field-trial data are irrelevant to the estimation of the occasion component of error in this narrower frame of reference, since there were no repeated measures within a term.

The "enduringness" issue is tied to a corollary set of questions: what conditions and processes affect the teacher's level of sense of autonomy and how stable are *they*? As just noted, the MITT Project incorporates assumptions about school conditions which, if stable over a period of time, will yield stable autonomy scores, and the assumptions will be subject to empirical test in the course of the main study. Thus, we should be in a better position to address the "enduringness" issue and the appropriate time interval within which to estimate occasion error at the end of the study than at the beginning.

Meanwhile, we have an estimate of internal consistency

reliability derived from the field-test sample of 126 teachers whose value is .90. A somewhat smaller coefficient (.87) was obtained from the 24-teacher subsample at the first test administration, but that could be the result of the slightly restricted range of mean scores in the subsample, a standard deviation of .51 (around a mean of 4.74) compared with a standard deviation of .66 (around a mean of 4.65) in the full sample. The larger coefficient is the better estimate.

3. Independence from other phenomenological variables. Teacher sense of autonomy in work is one of several phenomenological variables hypothesized in the MITT Project to be related to one another in specified ways. It is of considerable significance to certify that our measure of sense of autonomy is reasonably independent of measures of the other teacher attributes, especially since all are to be assessed through responses to questionnaires. We did not want the sense of autonomy items inadvertently to be alternative ways of measuring one or more of the other variables.

Factor analyses of items in all of the principal subjective scales was our method of determining the extent of independence. We followed both orthogonal and oblique rotational solutions, the latter on the grounds that the variables, while conceptually distinct, would not necessarily be uncorrelated with one another. Appendix D describes the results of the analyses in detail, and the reader is referred to that source.

Here it is sufficient to report that the more definitive of the factor analyses, based on the first wave of data from the main

study, demonstrated substantial independence of the sense of autonomy scale. Items from five scales were included in the analysis besides sense of autonomy--Meyer and Cohen's measure of job-career satisfaction (5 items), the Pellegrin measure of work satisfaction (10 items), two scales indicative of sense of collegial power in school-wide affairs (5 items each), and a measure of professional ambition of teachers (4 items), the latter three also attributable to Meyer and Cohen. Counting the 24 sense of autonomy items, a total of 53 items were included in the factor analysis. Fourteen factors with eigenvalues exceeding 1.00 were extracted and rotated orthogonally for this analysis, and 12 of these factors were nontrivial and interpretable.

The sense of autonomy items were distributed over six of the 12 factors. By and large, these factors represented recognizable dimensions within the sense of autonomy scale, as we describe in the Section F of the appendix. Only two items from scales other than sense of autonomy had loadings of .30 or greater on any of these six factors, and the loadings were comparatively low (.31 and .37). The remaining six nontrivial factors clearly reflected the other scales in the factor analysis and, conversely, only three sense of autonomy items had loadings greater than .30 on any of them; again, their loadings had low values of .30 and .36. In short, the sense of autonomy scale was found to be substantially independent of the other phenomenological variables measured in the same questionnaire.

E. Sense of Autonomy Scores in the MITT Project Schools

In this section we report the general distribution characteristics and selected breakdowns of scores from the sense of autonomy scale. The data are for 600 classroom teachers in the 40 elementary schools of the MITT study who completed questionnaires administered in the first round of data collection in late April and early May of 1974. Scores from the 24-item scale were computed according to the procedures described in Section A of this appendix.

Table 4 shows the distribution of scores, grouped in intervals of .5, for all of the classroom teachers. Of the 619 teachers, 22 failed to respond to three or more of the items and scores were not computed for them. The mean score was 4.67 for the population, with a standard deviation of .578 (computed from ungrouped data). In principle, the scores can range from a low of 1.00 to 6.00, the highest sense of autonomy value, but the lowest score found among the teachers was 2.25. Two teachers had scores of 6.00. The frequency distribution has a pronounced negative skew, as the histogram of the scores indicates. (See Fig. 1.)

The few male teachers in the population (8 per cent) had slightly lower mean scores than females.

	Mean	Standard Deviation	Number
Male	4.60	.602	46
Female	4.67	.572	550

With respect to teacher age, Table 5 reporting mean scores by age group indicates that teacher sense of autonomy increases regularly from one age category to the next higher, accompanied, as the reader can

TABLE 4: Frequency Distribution of Grouped Sense of Autonomy Scores, MITT Teachers Spring 1974. N = 619

Score Interval	Number	Percent
2.0 - 2.5	1	.2
2.6 - 3.0	3	.5
3.1 - 3.5	18	3.0
3.6 - 4.0	67	11.2
4.1 - 4.5	149	25.0
4.6 - 5.0	207	34.7
5.1 - 5.5	128	21.4
5.6 - 6.0	24	4.0
Total	597	100.0%
No Score	22	

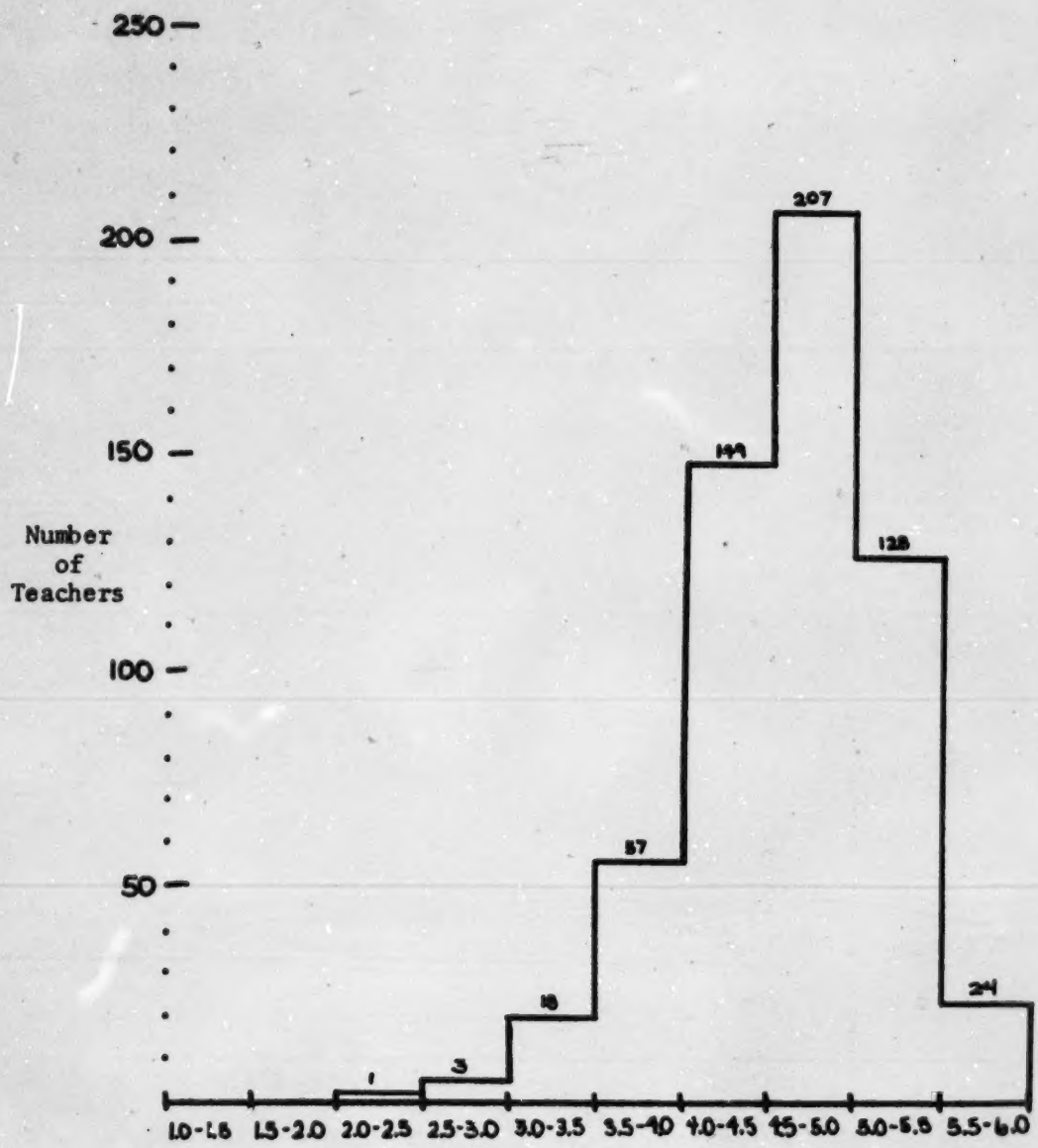

Fig. 1: Histogram of Sense of Autonomy Scores

MITT Teachers, Spring 1974

TABLE 5: Sense of Autonomy, by Age Group, MITT Teachers, Spring 1974.

Age Group	Mean	S.D.	Number
20 - 29 Years	4.59	.594	276
30 - 39	4.67	.588	132
40 - 49	4.74	.522	84
50 - 59	4.82	.531	68
60 years and over	4.93	.496	23
Total			583

observe from the standard deviations, by a decrease in score dispersions. The youngest category of teachers containing nearly half of the population has scores widely dispersed around the mean of 4.59, while teachers in the 60-69 age bracket had somewhat more uniform scores around their mean of 4.93.

In Table 6 we have assembled the sense of autonomy score breakdowns by total years of teaching experience and years of tenure in the school, categorized in finer groupings for the earlier years than for the later years. Both data sets have a form similar to the age breakdown--lower sense of autonomy scores (and larger dispersions) among teachers with less experience or tenure, and higher scores (with smaller dispersions) among those with longer experience or tenure. While the relationships do not appear to be as regular as in the case of age, this is partly a result of the way the data are grouped in the table. Recategorization in 10 year intervals of experience and tenure reveals the progression of scores to be more consistent for both breakdowns, although the progressions still are not as regular as that for age. All three variables, of course, are highly correlated, and it is impossible to discern their independent contributions from these tabulations.

With one prominent exception, grade-level assignment of teachers (K-6) was not associated with sense of autonomy. The 43 kindergarten teachers in the study (7 percent) had substantially higher scores than grade-level instructors.

TABLE 6: Sense of Autonomy Scores by Years of Teaching Experience and Years in Present Position (Tenure) MITT Teachers, Spring 1974. N = 619

Years	Teaching Experience Mean	S.D.	Number	Tenure in School Mean	S.D.	Number
1 Year	4.64	.619	57	4.66	.607	154
2 - 3	4.61	.592	128	4.60	.612	193
4 - 5	4.55	.604	89	4.69	.470	81
6 - 7	4.62	.526	57	4.76	.680	42
8 - 9	4.80	.596	38	4.80	.515	29
10 - 14	4.75	.578	65	4.73	.476	41
15 - 19	4.67	.465	55	4.57	.586	18
20 - 29	4.65	.597	51	4.99	.307	19
30 or more	4.98	.453	48	4.89	.323	8
Total			588			585

	Mean	S.D.	Number
Kindergarten	4.86	.563	43
Grades 1 to 6	4.66	.574	533

Means for teachers at the other grade levels varied only slightly around the mean of 4.66. (Excluded from these calculations were 21 seventh- and eighth- grade teachers who represented a unique group.)

In sum, sense of autonomy scores, with a mean in the population of 4.67, were slightly higher for females than males, considerably higher for kindergarten teachers than for teachers of grades one through six, and increased with teacher age, years of teaching experience, and years of tenure in the school.

F. Dimensions of the scale

Several factor analyses implicating items of the sense of autonomy measure were run at various times in the course of the scale's development, partly in an effort to discern its underlying dimensionality. Some analyses incorporated items from a number of MITT scales, but two were run on the autonomy items separately: one on the 26 items for teachers in the field test and one on the 24-item scale for a 50 percent sample of teachers from the first wave of the main study. The dimensionality of the scale was fairly consistent across all of these analyses. Here we present results of the analysis based on responses of teachersin the main study, N = 289, which is representative of findings from the others.

For these data, seven of the extracted factors whose

eigenvalues exceeded 1.00 were rotated to an oblique solution.[3] We have reproduced the unrotated factor matrix in Table 7 and have rearranged items and otherwise simplified the display of the rotated matrix in Table 8. The last table, 9, gives the matrix of factor correlations. The reader should refer to Table 1 in Section A of this appendix for the exact wording of items.

Although not necessarily intended or expected, the factors obtained from the analyses corresponded roughly to components of the autonomy domain suggested by Blauner and Lortie and that guided our item preparation. We had not written items to tap each component exclusively and, indeed, few items loaded on only one of the factors to the exclusion of others, even with oblique rotation, but there seemed to be a general correspondence between the components and the resulting factors. We will discuss the factors roughly in the order of their appearance in the factor analysis.

Freedom to determine student assessment criteria. Items related in any way to feelings of external constraint over student assessment or grading standards consistently appeared as a separate factor in our various analyses.

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3. We used the FACTOR subprogram from Statistical Packages for the Social Sciences for the computations. Initial factor extraction was done by the principal factor method with iterated communalities (PA2) and, for oblique rotation, the delta parameter was set at zero.

TABLE 7: Unrotated Factor Matrix and Estimated Communalities for 24-Item Sense of Autonomy Scale, MITT Teachers, Spring 1974.*

Item Number	I	II	III	IV	V	VI	VII	Communality
1	.56131	-.58054	-.24259	-.00530	.25724	.10742	-.02290	.78921
2	.62364	-.46282	-.08094	-.14690	.16328	-.07496	-.08930	.67151
3	-.38222	-.01040	.36288	.04289	.28670	.00045	-.09822	.37157
4	.62158	-.34977	.00521	.00290	-.05260	-.22695	-.05160	.56568
5	-.30301	-.11926	.01173	.08344	.15102	.35852	-.15070	.28718
6	-.51349	-.23408	.18945	.37757	-.05044	.14598	-.05046	.52332
7	-.52094	-.38614	-.05490	.22800	-.23435	-.16278	.02231	.55740
8	-.32806	-.20675	.41120	.22518	-.04283	-.16476	.11157	.41159
9	.40853	-.03162	-.22374	.11602	-.08876	.13469	.14335	.27799
10	-.37726	-.12541	.27036	-.20235	.03587	-.22257	.01791	.32324
11	.21750	-.31220	-.12283	.10547	-.05703	-.02500	.21794	.22236
12	-.46663	-.23584	.35223	-.33443	.08865	-.04695	-.06557	.52364
13	.60264	.17286	.03289	.32270	.11268	-.15388	-.05879	.53810
14	-.45740	-.36065	.04203	-.18880	-.14365	.22044	.30849	.54109
15	.41326	-.01797	.13724	.19195	.13025	-.13209	.01810	.26153
16	-.42885	-.00458	.14989	.11330	.08321	.16556	.09450	.26250
17	-.46940	.00394	-.26289	-.03693	.17395	-.08284	-.03194	.32897
18	-.63415	.06688	-.32339	.03485	.26398	-.13026	.25938	.66635
19	.60995	-.05848	.25645	.16362	.02912	.17390	-.01405	.49929
20	-.43203	-.00102	-.08707	.15428	.30045	-.09368	.17808	.34879
21	.48292	.17105	.19186	-.07011	.28289	.09437	.18863	.42871
22	.56880	-.07299	.19097	-.05934	.00483	.03355	.09240	.37854
23	-.68997	-.05873	-.21406	.06465	.04335	-.01930	-.15534	.55588
24	-.33038	-.18240	-.14891	.02867	.05069	.02992	-.31377	.26733
Per Cent of Variance	54.7	12.7	10.4	6.7	5.8	5.0	4.8	

*Correlation matrix based on 50 per cent sample, N = 289.

TABLE 8: Factor Structure of 24-Item Sense of Autonomy Structure, Obliquely Rotated, MITT Teachers, Spring 1974.*

Item Number	Factor** I	II	III	IV	V	VI	VII
Student assessment criteria							
19	.57				.49		
22	.50				.47		
17	-.53						
20	-.57						
23	-.60				-.60		
Pace of work							
1		.86					
2	.44	.79					
4	.50	.66				.40	
Time pressure							
9			.49				
3			-.50				
10			-.54				
12			-.69				
Uninterpreted							
8				-.56			
6				-.48		-.47	
Surveillance							
21					.64		
24					-.44		
7				-.40	-.60		-.40
Uninterpreted							
5						-.52	
Techniques of work							
14							-.71
13			.42		.41		.61

*Only factor loadings of .40 or greater are entered in the table.

**Factors have been reflected so that positive loadings indicate high sense of autonomy.

TABLE 9: Correlations of Seven Factors Obliquely Rotated, MITT Teachers, Spring 1974

	Correlations*					
	II	III	IV	V	VI	VII
I	.39	.30	.08	.41	.30	.31
II		.33	-.01	.20	.22	.13
III			.14	.24	.26	.21
IV				-.01	.07	.11
V					.22	.33
VI						.13

*Factors have been reflected so that positive values indicate high sense of autonomy.

Factor 1 of the data in Table 8 is a case in point. The bellweather item of this factor, loading - .81, is:

> 18. I feel I have little to say over how the progress of my students is to be judged.

Three others of the same type had substantial loadings on the factor; they concerned "uneasy feelings about giving unusually high (or low) grades to classes" (Item 17), the feeling that "I must abide by someone else's ideas about grading" (Item 20), and the belief that "the principal trusts my judgment when it comes to student evaluation (Item 19).

Control over the pace of work. Blauner believed that the worker's ability to establish the timing of acts and the rhythm of work during the day is a central component of autonomy. "The pace of work", he wrote, "is probably the most insistent, the most basic, aspect of a job and retaining control in this area is a kind of affirmation of human dignity" (Blauner, 1964, p. 21). While he had in mind constraints imposed by machinery and the workflow primarily, teachers, too, varied along a dimension of the pace of work. Factor II has three items defining it:

> 1. On the whole, my students and I can establish the rhythm of daily activities rather than have it determined for us by people of events outside the classroom.
>
> 2. Generally speaking, I can pretty well decide my own pace of work as a teacher.
>
> 4. In my present job I feel relatively free to decide how fast to cover instructional material with my students.

The items point to the importance elementary teachers attach to being able to work out a flexible teaching routine with their pupils,

modifiable at the teacher's discretion and free of constant interruptions and arbitrary time boundaries. Smith and Geoffrey (1968) emphasized the significance to teachers of establishing the classroom "activity structure" of the classroom and Reynolds (1972) found that elementary teachers were especially unsettled by an innovative school program seriously fragmenting the teacher's day and week and making it nearly impossible to develop a classroom routine for the students.

Freedom from work pressures. Closely associated with pacing is the feeling of being able to regulate the pressures of work that characteristically impinge on the individual in some work environments. Time to do what needs to be done with students is the pervasive enemy of the teacher, and items alluding to the press of time consistently grouped together to define such a factor in our various analyses. In the present instance they appeared as Factor III, including:

3. Much of the time I feel pressed by the daily schedule.

9. Aside from things which lie in myself, there is little that holds me back from doing a good job of teaching.

10. I simply cannot find the time I need in this school to do the kind of job of teaching I know I am able to do.

12. I rarely have a chance to use the teaching methods I think work best for me.

In other factor analyses these items were joined by additional ones to aid in the factor's interpretation, particularly Item 1 (shown in connection with the pace of work factor, above) and Item 8, referring to feelings about being tied down to the classroom. These two items

had loadings in the high 30's on Factor III, just below the cut-off point of .40 we used for the display in Table 8.

We have been struck in earlier work (Charters, 1973) by the salience of the press of time in the concerns of teachers and especially (as we reflect on it) by their inclination to consider the time shortage as a generic condition of teaching. It is possible that Factor III has singled out something close to a competence aspect of sense of autonomy--a variation among teachers concerning their personal mastery of the time dilemma, a variation in their feelings of being able to take the work of teaching in stride. If so, we would wish to exclude it as not fitting our conceptualization of sense of autonomy, but it would require considerable more investigation to establish this possible interpretation than we have undertaken to date.

Freedom from surveillance. Factor V in Table 8 is defined by a number of items reflecting the teacher's beliefs about the extent to which he or she is under surreptitious surveillance of administrators or fellow teachers and must guard his or her demeanor. When this factor appeared in our first factor analysis we had an urge to refer to the dimension as "paranoid suspiciousness" in recognition of the content of the negatively worded items. The items deal with beliefs that other teachers are out to criticize one's teaching (Item 24), that one has to guard against "doing or saying the wrong things" in teaching (Item 23), and has to "look busy" even when there is nothing to do (Item 7). On the positive side the items concern beliefs that the principal "trusts my judgment" in evaluating students (Item 19), "no one is peering

over my shoulder at the way I teach" (Item 21), and "I can say whatever I wish" in the classroom (Item 22).

Freedom to choose the techniques of work. This factor, appearing as VII in the present data, was considerably more prominent in earlier analyses than it is here. The two items that clearly define it are:

13. I feel free to try out new teaching ideas with my classes.

14. Generally speaking, I feel as though the teaching techniques I can use are closely controlled in this school.

One item we would expect to find substantially loaded on this factor was only modestly so, at the level of -.34, *viz.*, "I rarely have a chance to use the teaching methods I think work best for me."

Other factors. The two other factors in Table 8 that we have not discussed, Factors IV and VI, are not readily interpretable, nor do the prior factor analyses give firm clues about them. Factor IV might be seen as related to Blauner's "freedom of physical movement" in light of the loading of Item 8, "I am so tied down to the classroom that I would find it hard to take a short break . . . ," and the other two items regarding the constraints on spending free time (Items 6 and 7). Factor IV, incidentally, is the one factor showing consistently low correlations with the other six factors, most of which are essentially zero. (See Table 9.) The meaning of Factor VI is also obscure to us. Only Item 5, concerning the "uncomfortable influence of the cirriculum guide on what I teach", is uniquely associated with it.

Conclusion. Our explorations into the dimensionality of the sense of autonomy scale suggests that there may, indeed, be several distinctive components of which sense of autonomy is comprised. The five factors we have interpreted are freedom to determine student assessment criteria, control over the pace of work, freedom from work pressures, freedom from surveillance, and freedom to choose the techniques of work. Given these factors, additional items are more pointed ones, conceivably could be written so that each component could be measured separately.

The fact remains, however, that the five interpretable factors are substantially intercorrelated (r's from .13 to .41) and all of the 24 scale items seem to tap a single underlying attribute of teachers--their feelings of autonomy in the work of teaching.[4] As noted elsewhere in this appendix, this psychological disposition is independent of other phenomenological responses of teachers relevant to the MITT research.

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4. Once again, the ambiguous Item 11 must be called to attention. It played no role in helping to interpret the factors, loading .37 on the pace of work factor and negligibly on all others, and probably should be deleted from the scale.

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